

Ethics.

Ethics is a huge topic in and of itself (see the Wikipedia entry, for example).

What is ethics? The definitions vary, but for our purposes we could loosely define ethics as:

The ideas/rules that we follow to do our work; or more specifically, the things we agree are correct to do.

In many respects it's very similar to morality.

A real discussion of ethics will probably include philosophy and religion.

Some problems we need to deal with:

While there is probably general consensus about some things, other things may vary depending on the society you live in.

E.g., using animals for food.

It would be easy to get carried away in a discussion of ethics, but we will concentrate on the things that are important to biological research.

What do we need to know about ethics?

To (grossly) simplify things, we can probably define three areas that we need to discuss:

- 1) Any research involving humans
- 2) Any research involving animals
- 3) Plagiarism and professional conduct

Plagiarism:

Copying someone else's work (sometimes one's own) without attribution (i.e., acknowledging that the work is someone else's is plagiarism.

Of course, you can't just copy vast amounts of stuff and then simply acknowledge it.

Plagiarism is an increasingly serious problem at academic institutions, sometimes involving high profile figures.

The punishment for plagiarism is often dismissal, stripping of tenure, etc. It can ruin your career.

For students, punishment usually involves the honor committee (at GMU), which can issue a number of different punishments.

In other words, plagiarism is considered a severe violation of professional conduct.

But note: this does not mean you shouldn't build your research on the work of others:

This is precisely what makes science work. Reading other people's research, coming up with new ideas, and expanding on previous results.

You need to make sure that your sources are properly acknowledged.

Newton: If I have seen further it is by standing on the shoulders of giants.

(You have to name the giants!)

So let's give some hypothetical examples:

A student writes a paper as an assignment for Ecology. She cites previous studies but does not include a section giving references.

In the same class, a student looks up various internet resources and finds a paper written by a student from the same class some years before. He copies the paper and hands it in as his own.

A third student quotes extensively from her sources. In fact, most of the paper is quotes that she provides from her sources. However, she cites and gives credit to all her quotes. She also includes an extensive section giving references.

Plagiarism examples:

A) Pangou (source: Science, vol 335, 2012)

Director of Study and Research, Biological Diversity, Brazzaville, Congo.

Patrick Jansen (ecologist in the Netherlands) was reviewing a paper:

Discovered 90% of it had been copied from a paper he had co-authored with Pierre-Michel Forget.

Even the figures and statistics were nearly identical.

Forget's father turns out to be a private detective in France.

Forget obviously inherited some of his father's interests.

Forget started to investigate Pangou, and discovered that nine or more papers that Pangou published between 2006 and 2011 were to some extent plagiarized.

This resulted in retraction of many of Pangou's papers.

Pangou “accepts” responsibility for all the retracted papers, but claims he did not deliberately plagiarize and blames “abusive utilization of bibliographies” and junior researchers.

It also turns out that Pangou added co-authors to his papers without informing said co-authors.

(These were plagiarized papers!)

B) Wegman (at GMU) (various sources, incl. Wikipedia and USA Today).

In 2006, Wegman (and co-authors) published a report taking issue with global warming.

The report attacked several analyses and claimed to have found numerous statistical errors in these analyses.

Unfortunately, that probably made Wegman a target of folks supporting the idea of global warming.

In any case, his paper came in for more than usual scrutiny.

Raymond Bradley complained in 2010 that large chunks of Wegman's report were lifted from his textbook as well as from Wikipedia.

CSDA (Computations Statistics & Data Analysis), which is where Wegman published his report, retracted the study in 2011.

GMU finally got involved.

They took way too long to deal with this.

Despite the fact that numerous examples are on the web showing whole pages copied almost word for word (and doubtful acknowledgments), GMU concluded that “no professional misconduct was involved”.

Wegman received a letter of reprimand (a second University committee did find evidence of plagiarism).

Case closed.

The results of the investigation are sealed.

GMU has been criticized for 1) taking over two years to investigate this, and 2) giving Wegman a slap on the wrist.

Wegman is still at GMU.

Other researches claim to have found other instances of plagiarism by Wegman.

Incidentally, Wegman is a very well known statistician. He has been at GMU since 1986, developed the Master's degree in statistics, headed up the seminar series, and has been heavily involved in defense work.

He has undoubtedly done a lot of very good work in the field of statistics.

Other professional conduct issues:

A) Falsifying data.

Obviously serious. But many people don't get caught.

Does this include “tweaking” your results to improve your conclusions?

Gregor Mendel (source: various places on web, common knowledge):

Yes, that Gregor Mendel.

It turns out that his results are “too” good. A statistical analysis performed by none other than Fisher, shows that his ratios were too good.

In other words, when Mendel predicted a 3:1 ratio, his results were almost in perfect agreement with 3:1.

A little like tossing a coin 100 times and getting exactly 50. Yes, it's what you expect, but it seems a bit too good to be true.

So did Mendel cheat?

Probably not. The general consensus is that he was “looking” for results that matched his predictions. He probably paid less attention to results that didn't match his predictions.

That wasn't cheating back then. He was looking for support for his theories.

These days, we would include all the results and then analyze them.

Dirk Smeesters (source: Science Insider):

A psychologist working in the Netherlands (Erasmus University)

Was asked to retract two papers because of problems with “integrity”

Accused of tweaking his data to make his results better.

Smeester claims this is accepted practice in his field (social psychology).

His data were too good (sound familiar?)

Smeesters said he eliminated the results from subjects that did not read instructions carefully (since this strengthened the results).

Smeesters can not recreate the original data due to a hard drive crash (raw results were lost in an office move).

Most of Smeesters students were rather surprised and consider Smeesters to have high ethical standards.

Smeesters appears to be cooperating, and at one point even asked for a meeting with the people overseeing misconduct.

Opinions??

B) Making up data.

Quick comment: obviously, this applies to making up data to publish results from this research.

Making up data for other purposes might be fine:

Generating data for student problems (e.g., in statistics).

Carefully “imputing” data to make up for missing values in a large data set (to allow certain statistical techniques to work).

In this case, mention ought to be made that this was done.

Diderik Stapel (working at the same institution as Smeesters) (source: Wikipedia)

Also in psychology.

Appears to have made up a lot of his data. At least 30 papers were based on made up data.

Never showed any data to his students.

There was even discussion about his dissertation, but he returned his degree himself.

(the data for his dissertation had been “destroyed”)

Stapel has since admitted to wrongdoing and has apologized.

C) Other issues:

Here are some examples:

1) Retraction issued by Science (vol 334, 2011):

Retracted an article linking a retrovirus to chronic fatigue syndrome.

The listed several reasons:

Numerous labs were unable to duplicate the results

Authors failed to mention important experimental manipulations

Several figures had already been retracted by the authors

Science goes on to say that the authors agreed to retract the article, but could not agree on the wording, so Science pre-empted them.

2) Cold fusion

A famous experiment conducted in 1989. Fleischmann and Pons claimed to have generated fusion in a jar sitting on a counter.

Cold fusion - nothing fancy needed.

Created a large amount of excitement.

Every attempt to replicate the experiment has failed.

Fleischman and Pons have since moved to France.

Almost everyone considers this as bogus at this point in time.

Possibly, what was observed was a chemical reaction that generated heat.
Not fusion.

As late as 2011, claims are made for cold fusion, but nothing has been “released”.

Opinions??

Research involving humans:

We won't do too much with this in this lecture

Everyone needs to pick a topic from the list that I'm passing around.

But here are a few issues, to get people to think about things:

1) Use of Nazi medical records.

As everyone knows, the Nazi regime conducted some horrific experiments on unwilling participants.

The ethics of these experiments are not in question - they are the worst sort of war crimes.

But what should be done with the data that was collected by German “scientists” and “doctors”?

Many did keep very careful records of what they were doing and of the results.

Should these data ever be used? To save lives? Thoughts? Opinions?

2) Yellow fever experiments

Walter Reed carried out numerous experiments on yellow fever.

Walter Reed suspected mosquitoes based on the work of Carlos Finlay (a Cuban doctor who first theorized mosquitoes as the vector for yellow fever).

Volunteers were intentionally exposed to infected materials.

Some early volunteers (incl. members of a supervisory board) volunteered because they doubted that mosquitoes transmitted the virus and wanted to “get on” with other lines of research.

After some volunteers did come down with yellow fever (including Reed's second in command, Lazear), many of these volunteers changed their minds!

After some of these initial results, more studies with volunteers were conducted.

Several of these were paid quite well (\$8,000 for participating, \$20,000 if they contracted yellow fever (in today's dollars)).

As the experiments continued, volunteers were also better cared for. Still, even in the final phase of the experiment, three volunteers died (including the only female volunteer).

It should be stressed that every one (volunteers included!) knew of the risks.

This research did establish mosquitoes as the vector for yellow fever and initiated control programs and helped save countless lives.

3) Finally, we should mention a clear example of unethical experimentation conducted by Americans:

Aurali mentioned the Tuskegee syphilis experiment.

The experiment was continued despite treatment being available.

Numerous people died from late stage syphilis.

Experimenters actually made attempts to prevent “participants” from getting treatment elsewhere (fortunately many did!)

(When the experiment started, there was no effective treatment for syphilis, so following the course of the disease was not considered unethical)

Research involving animals (see Wikipedia):

Why are these necessary?

Many people argue that most medical breakthroughs in the 20th century have their origin in animal experiments.

Some examples:

anthrax testing in sheep

conditioning (Pavlov)

insulin was isolated in dogs

leprosy treatments developed using armadillos

U.S. law requires animal testing to establish drug safety

But some of this has been controversial for years:

Quoting Charles Darwin (via Wikipedia):

You ask about my opinion on vivisection. I quite agree that it is justifiable for real investigations on physiology; but not for mere damnable and detestable curiosity. It is a subject which makes me sick with horror, so I will not say another word about it, else I shall not sleep to-night.

It does seem reasonable that some care should be taken in working with animals

GMU has lots of rules and regulations (Aurali discussed many of these earlier this semester).

What are the problems with animal testing?

Do animals have rights?

In general, most people agree that animal testing (for science/medicine) is necessary.

But it should be minimized, and particular attention should be paid to suffering.

There are some organizations (PETA) which take the extreme viewpoint of banning all animal testing.

Note: violence has been threatened and carried out in some cases.

A comment:

Opinion on animal research varies widely depending on the animal used!